

AMENDMENTS TO THE CLAIMS

The following is a complete, marked-up listing of revised claims with a status identifier in parenthesis, underlined text indicating insertions, and strike through and/or double-bracketed text indicating deletions.

LISTING OF CLAIMS

1. (Canceled)
2. (Currently Amended) The antenna according to claim [[1]] 18, wherein the plurality of pairs of dipoles are oriented in one direction in order to at least one of transmit and receive waves of one linear polarization.
3. (Currently Amended) ~~The antenna according to claim 1,~~ An antenna for at least one of transmitting and receiving electromagnetic waves, comprising:
a plurality of pairs of electric dipoles, each pair of dipoles being parallel with respect to each other and oppositely located thereof, wherein each dipole includes two or more conducting lines that are connected at one or more point or an extended part of the conducting lines, and the dipole of each pair of dipoles provides at least one of radiating and receiving with approximately the same amplitude and phase, at least some of said plurality of pairs of dipoles have different properties and the dipoles being arranged in such a way that geometrical center of each pair of dipoles are at least approximately coinciding; and
a conducting body acting as a ground plane, above which the plurality of pairs of dipoles are located,
wherein approximately half the plurality of pairs of dipoles are oriented in

one direction and the rest in an orthogonal direction, in order to at least one of transmit and receive waves of at least one of dual linear polarization and circular polarization.

4. (Canceled)

5. (Currently Amended) ~~The antenna according to claim 1, further comprising~~
An antenna for at least one of transmitting and receiving electromagnetic waves,
comprising:

a plurality of pairs of electric dipoles, each pair of dipoles being parallel
with respect to each other and oppositely located thereof, wherein each dipole
includes two or more conducting lines that are connected at one or more point or an
extended part of the conducting lines, and the dipole of each pair of dipoles provides
at least one of radiating and receiving with approximately the same amplitude and
phase, at least some of said plurality of pairs of dipoles have different properties and
the dipoles being arranged in such a way that geometrical center of each pair of
dipoles are at least approximately coinciding;

a conducting body acting as a ground plane, above which the plurality of
pairs of dipoles are located; and

metal lines connecting neighboring dipoles of each pair of dipoles, the
metal lines do not cross each other.

6. (Currently Amended) ~~The antenna according to claim 1,~~ An antenna for at
least one of transmitting and receiving electromagnetic waves, comprising:

a plurality of pairs of electric dipoles, each pair of dipoles being parallel

with respect to each other and oppositely located thereof, wherein each dipole includes two or more conducting lines that are connected at one or more point or an extended part of the conducting lines, and the dipole of each pair of dipoles provides at least one of radiating and receiving with approximately the same amplitude and phase, at least some of said plurality of pairs of dipoles have different properties and the dipoles being arranged in such a way that geometrical center of each pair of dipoles are at least approximately coinciding; and

a conducting body acting as a ground plane, above which the plurality of pairs of dipoles are located,

wherein the conducting body located under the plurality of pairs of dipoles and acting as ~~[[a]]~~ the ground plane is non-flat.

7. (Currently Amended) ~~The antenna according to claim 1,~~ An antenna for at least one of transmitting and receiving electromagnetic waves, comprising:

a plurality of pairs of electric dipoles, each pair of dipoles being parallel with respect to each other and oppositely located thereof, wherein each dipole includes two or more conducting lines that are connected at one or more point or an extended part of the conducting lines, and the dipole of each pair of dipoles provides at least one of radiating and receiving with approximately the same amplitude and phase, at least some of said plurality of pairs of dipoles have different properties and the dipoles being arranged in such a way that geometrical center of each pair of dipoles are at least approximately coinciding; and

a conducting body acting as a ground plane, above which the plurality of pairs of dipoles are located,

wherein the dipoles are at least one of V-shaped and curved.

8. (Currently Amended) The antenna according to claim [[1]] 18, wherein the dipoles are made of at least one of conducting wires, tubes and strips.

9. (Currently Amended) The antenna according to claim [[1]] 18, wherein the dipoles are made by conducting strips on a dielectric substrate.

10. (Currently Amended) ~~The antenna according to claim 1,~~ An antenna for at least one of transmitting and receiving electromagnetic waves, comprising:

a plurality of pairs of electric dipoles, each pair of dipoles being parallel with respect to each other and oppositely located thereof, wherein each dipole includes two or more conducting lines that are connected at one or more point or an extended part of the conducting lines, and the dipole of each pair of dipoles provides at least one of radiating and receiving with approximately the same amplitude and phase, at least some of said plurality of pairs of dipoles have different properties and the dipoles being arranged in such a way that geometrical center of each pair of dipoles are at least approximately coinciding; and

a conducting body acting as a ground plane, above which the plurality of pairs of dipoles are located,

wherein the dipoles are excited by connecting together the endpoints of neighboring parallel dipoles of each pair of dipoles so as to form serpentine-shaped lines.

11. (Currently Amended) The antenna according to claim [[1]] 18, wherein at least one dipole comprises two oppositely directed conducting arms with a feed gap

therebetween.

12. (Canceled)

13. (Previously Presented) The antenna according to claims 11, wherein the feed gaps of the neighboring dipoles of different dipole pairs are excited by two-conductor feed lines starting from at least one feed point.

14. (Currently Amended) The antenna according to claim ~~[[1]]~~ 18, wherein each dipole includes two opposite arms, and each dipole arm includes two conducting lines that are connected at an outer end whereas an inner end at a feed gap is connected with the inner end of the closest line of at least one of a neighboring inner and outer dipole arm, so that one set of dipoles with feed lines are formed by two opposing serpentine-shaped lines.

15. (Currently Amended) The antenna according to claim ~~[[1]]~~ 18, wherein the dimensions of each dipole pair have a dipole length of approximately 0.5 wavelength, a dipole height over ground between 0.05 and 0.30 wavelength, and a dipole spacing of approximately 0.5 wavelength, where the wavelength is for a frequency of which a given dipole pair is the dominating contributor of radiation pattern.

16. (Currently Amended) The antenna according to claim ~~[[1]]~~ 18, wherein dimensions of different dipole pairs varies in a log-periodic manner in order to make a very broadband overall performance.

17. (Currently Amended) The antenna according to claim [[1]] 18, wherein radiation patterns have an almost constant beam width over a very wide frequency band that may be several octaves.

18. (Currently Amended) ~~The antenna according to claim 1,~~ An antenna for at least one of transmitting and receiving electromagnetic waves, comprising:

a plurality of pairs of electric dipoles, each pair of dipoles being parallel with respect to each other and oppositely located thereof, wherein each dipole includes two or more conducting lines that are connected at one or more point or an extended part of the conducting lines, and the dipole of each pair of dipoles provides at least one of radiating and receiving with approximately the same amplitude and phase, at least some of said plurality of pairs of dipoles have different properties and the dipoles being arranged in such a way that geometrical center of each pair of dipoles are at least approximately coinciding; and

a conducting body acting as a ground plane, above which the plurality of pairs of dipoles are located,

wherein the antenna is used to illuminate at least one of a single, a dual and a multi ~~and dual~~ reflector antenna system.

19. (Currently Amended) ~~The antenna according to claim 1,~~ An antenna for at least one of transmitting and receiving electromagnetic waves, comprising:

a plurality of pairs of electric dipoles, each pair of dipoles being parallel with respect to each other and oppositely located thereof, wherein each dipole includes two or more conducting lines that are connected at one or more point or an extended part of the conducting lines, and the dipole of each pair of dipoles provides

at least one of radiating and receiving with approximately the same amplitude and phase, at least some of said plurality of pairs of dipoles have different properties and the dipoles being arranged in such a way that geometrical center of each pair of dipoles are at least approximately coinciding; and

a conducting body acting as a ground plane, above which the plurality of pairs of dipoles are located,

wherein at least one balun is arranged in a central region between the plurality of pairs of dipoles.

20. (Currently Amended) ~~The antenna according to claim 1,~~ An antenna for at least one of transmitting and receiving electromagnetic waves, comprising:

a plurality of pairs of electric dipoles, each pair of dipoles being parallel with respect to each other and oppositely located thereof, wherein each dipole includes two or more conducting lines that are connected at one or more point or an extended part of the conducting lines, and the dipole of each pair of dipoles provides at least one of radiating and receiving with approximately the same amplitude and phase, at least some of said plurality of pairs of dipoles have different properties and the dipoles being arranged in such a way that geometrical center of each pair of dipoles are at least approximately coinciding; and

a conducting body acting as a ground plane, above which the plurality of pairs of dipoles are located,

wherein at least one 180 deg hybrid is arranged in a central region between plurality of pairs of dipoles.

21. (Previously Presented) The antenna according to claim 19, wherein at least

one of the balun and a 180 deg hybrid is realized as an active circuit including transistor amplifiers.

22. (Previously Presented) The antenna according to claim 19, wherein the plurality of pairs of dipoles are located above the conducting body, wherein at least one of the balun and a 180 deg hybrid is located behind the ground plane in the central region with transmission lines providing a connection through the ground plane.

23. (Currently Amended) ~~The antenna according to claim 1,~~ An antenna for at least one of transmitting and receiving electromagnetic waves, comprising:

a plurality of pairs of electric dipoles, each pair of dipoles being parallel with respect to each other and oppositely located thereof, wherein each dipole includes two or more conducting lines that are connected at one or more point or an extended part of the conducting lines, and the dipole of each pair of dipoles provides at least one of radiating and receiving with approximately the same amplitude and phase, at least some of said plurality of pairs of dipoles have different properties and the dipoles being arranged in such a way that geometrical center of each pair of dipoles are at least approximately coinciding; and

a conducting body acting as a ground plane, above which the plurality of pairs of dipoles are located,

wherein at least one dipole includes two oppositely directed conducting arms with a feed gap therebetween, and

wherein the feed gaps of neighboring dipoles of different dipole pairs are excited by a two-conductor feed line starting from at least one feed points, the two

separate conductors of the two-conductor feed line being arranged in at least two different, non-intersecting planes.

24. (Previously Presented) The antenna according to claim 23, wherein the two-conductor feed line comprise a first conductor in a first plane, and a second conductor at least partly arranged in a second plane, said first and second planes being different and non-intersecting to each other.

25. (Previously Presented) The antenna according to claim 24, wherein at least part of the dipole conducting arms are arranged in said first plane.

26. (Previously Presented) The antenna according to claim 24, wherein the dipoles are made by conducting strips on a dielectric substrate, and wherein the first and second planes are arranged on different sides of said substrate.

27. (Currently Amended) ~~The antenna according to claim 1,~~ An antenna for at least one of transmitting and receiving electromagnetic waves, comprising:

a plurality of pairs of electric dipoles, each pair of dipoles being parallel with respect to each other and oppositely located thereof, wherein each dipole includes two or more conducting lines that are connected at one or more point or an extended part of the conducting lines, and the dipole of each pair of dipoles provides at least one of radiating and receiving with approximately the same amplitude and phase, at least some of said plurality of pairs of dipoles have different properties and the dipoles being arranged in such a way that geometrical center of each pair of dipoles are at least approximately coinciding; and

a conducting body acting as a ground plane, above which the plurality of pairs of dipoles are located,

wherein the plurality of pairs of dipoles are arranged on one side of a substrate, and a first conductor of a two-conductor feed line is arranged on ~~this~~ the same side thereof of the substrate, whereas a second conductor of said two-conductor feed line is arranged at least partly on an opposite side of the substrate, and being connected to the dipoles through the substrate.

28. (Previously Presented) The antenna according to claim 27, wherein the second conductor connects dipoles within at least some of the dipole pairs to each other, said dipole pairs thereby being excited by electromagnetic coupling to neighboring dipoles.

29. (Currently Amended) The antenna according to claim ~~[[1]]~~ 18, wherein for at least some of the dipole conducting arms are arranged on opposite sides of a substrate, and wherein a separate conductor of a two-conductor feed line is arranged on each side for exciting the dipole conducting arms arranged on said sides.

30. (Currently Amended) The antenna according to claim ~~[[1]]~~ 18, wherein most of dipole conducting arms are arranged on one side of a substrate, and conductors of a feed line are wound in parallel on a dielectric rod so that different windings of the lines are connected to different dipole conducting arms.

31. (Currently Amended) ~~The antenna according to claim 1,~~ An antenna for at least one of transmitting and receiving electromagnetic waves, comprising:

a plurality of pairs of electric dipoles, each pair of dipoles being parallel with respect to each other and oppositely located thereof, wherein each dipole includes two or more conducting lines that are connected at one or more point or an extended part of the conducting lines, and the dipole of each pair of dipoles provides at least one of radiating and receiving with approximately the same amplitude and phase, at least some of said plurality of pairs of dipoles have different properties and the dipoles being arranged in such a way that geometrical center of each pair of dipoles are at least approximately coinciding; and

a conducting body acting as a ground plane, above which the plurality of pairs of dipoles are located,

wherein at least some of the plurality of pairs of dipoles have dipoles being connected to separate feed lines.

32. (Currently Amended) The antenna according to claim [[1]] 31, wherein at least some neighboring plurality of pairs of dipoles are connected to separate feed lines.